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ABSTRACT

Differences in the normative data presented in the Koppitz Scoring System for the Bender Gestalt Test (a measure for diagnosing learning and neurological disorders) were compared for 838 elementary age children of the Sioux, Chippewa, Navajo, and Apache tribes and a Koppitz normative group. Considered were mean error differences and mean time differences, sex differences, and reservation/non-reservation differences. Results indicated statistically significant differences between American Indian samples and the non-Indian group at a number of age levels on mean errors. Significant differences were found at some ages between tribes on mean errors and mean time. Sources of differences, the need for developing specific normative data for groups with marked cultural and learning pattern differences, and appropriate interpretation of these data were discussed. (Author/SBH)

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PERFORMANCE OF AMERICAN INDIAN CHILDREN COMPARED WITH KOPPITZ NORMATIVE POPULATION ON THE BENDER

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Abstract

Two research studies are reported which examine differences between the normative data presented in the Koppitz Scoring System for the Bender Gestalt Test and the scores of children from four American Indian tribes; one study reports comparison between reservation and non-reservation subjects' scores.

A total of 838 children of the Sioux, Chippewa, Navajo, and Apache tribes were compared within and between groups and with Koppitz' normative group for mean error differences and mean time differences, for sex differences, and (between two tribes) for reservation/non-reservation differences.

Results indicate that statistically significant differences appear between American Indian samples and the non-Indian group at a number of age levels on mean errors; significant differences were found at some ages between tribes on mean errors and mean time. The discussion centered on sources of differences, on the need for developing specific normative data for groups with marked cultural and learning pattern differences, and on appropriate interpretation of these data.

The development of widespread educational programs for children with learning disabilities and the mandating of such services by Federal law in the United States have led to new emphasis upon diagnostic instruments which yield information about learning styles and deficiencies. The inclusion of tests of visual-motor integration, such as the Bender Gestalt Test, in diagnostic test batteries comes from the observation that deviant performances on such tests are often shown both by children with established neurological impairments and children with learning disabilities (McCarthy and McCarthy, 1969). Koppitz (1964) has provided an objective scoring system for the Bender Gestalt Test for use with children from five years through ten years, eleven months of age.

Previous research has shown samples of American Indians to differ significantly on visual learning measures (Bland, 1970; Garber, 1968; Lowry, 1970; Lombardi, 1970; Kuske, 1972; Ortiz, 1965; Robinson, Williams, and Stevens, 1978; Western New Mexico University, 1967). The two studies reported investigate the applicability of Koppitz' normative data to American Indians. Vincent* (1974), in Study 1, administered the Bender to Navajo and Apache Indian children aged 6-0 to 10-11 residing on reservations in New Mexico. Asmussen (1976), in Study 2, studied both reservation and non-reservation children of the Sioux and Chippewa tribes residing in South Dakota and Minnesota. Both sought to determine if the samples studied statistically resembled Koppitz' normative population closely enough to justify use of Koppitz' norms for mean errors and mean time with these groups.

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Method

In Study 1, Navajo and Apache subjects were compared: a) with the normative population for mean errors and test time; b) with each other for mean errors; and c) within tribes by sex for mean errors. In Study 2, Sioux and Chippewa children were compared: a) with the normative population for mean errors and test time; b) with each other for mean errors; c) within tribes by sex for mean errors; and d) with reservation and non-reservation school enrollment for mean errors. Subjects were four samples of American Indian children comprising all children who met the following criteria: a) membership in the Apache, Navajo, Sioux, or Chippewa tribes by virtue of one-quarter or more lineage of that tribe; b) in attendance at one of the target schools; c) within the target age range when the test was administered. The total non-reservation sample comprised 104 Sioux and 98 Chippewa students from four schools. The reservations samples were as follows: 142 Navajo, 104 Sioux, 182 Chippewa--all attending Bureau of Indian Affairs Schools--and 208 Apache residing and attending school on the Mescalero Apache Reservation.

Procedure

The Bender Gestalt test was administered individually according to standardized procedures as described by Koppitz (1964). No time limits were given, but time taken was recorded. Navajo and Apache students were tested early in the fall semester; Sioux and Chippewa students were tested in the period from November through January. All were tested in their home schools; over 90% were seen during regular school hours.

Results

Study 1, using the *t*-test for independent scores, found significant differences in mean error scores between tribes at ages 6-0 to 6-11 and 10-0 to 10-11 (Table 1). At age 6-0 to 6-11, Navajo children showed significantly more

errors than Apache; at 10-0 to 10-11, Apache showed significantly more errors than Navajo. At age 8-0 to 8-11, Navajo children took significantly longer than Apache to complete the drawings. At those age levels which showed no significant error differences, the two tribal groups were combined and compared with the Koppitz normative group, using the z test (Table 2). No significant differences appeared. Age groups with significant inter-tribal error differences were compared separately with the normative group; again no significant differences were found. At the age levels at which no significant time differences between Navajo and Apache occurred, data were grouped and compared with the normative group; no significant differences were found.

Study 2 compared error scores of Sioux and Chippewa children and found no significant differences. Comparison of grouped scores of Sioux and Chippewa subjects with the normative group (Table 2) indicated that the sample did not fit the population for mean errors at all chronological age levels; significant differences in mean time scores were found at ages 5-0 to 7-5 and 9-0 to 9-11. No statistically significant differences were found for mean errors by sex or location in either study.

Discussion

Both studies were handicapped somewhat by size of samples at some age levels. No firm conclusions may be reached with a wide degree of generalization for all Apache, Navajo, Chippewa and Sioux children, or for those American Indian children educated in reservation or non-reservation schools. However, trends are noted which may be helpful in practical application and which indicate further needed research.

Study 1 Navajo children showed more difficulties with visual-motor integration at the lowest age level tested, 6-0 to 6-11, and significantly fewer at 10-0 to 10-11. This may be influenced by the fact that all but three Navajo

6-year-olds were in their first year of school and the first few weeks away from home in boarding school. All Apache children were living at home with their families and almost all Apache 6-year-olds had been enrolled in a full year of kindergarten. It is possible that both experience and emotional factors may have influenced the performance of Navajo 6-year-olds as compared to Apache. This initial lag was not reflected in scores of Navajo students at other age levels and by age 10 the Navajo sample surpassed the Apache significantly in quality of performance. Other researchers (Garber, 1968; Western New Mexico University, 1967) have found Navajo subjects always among the higher achieving groups on visual-perceptual-motor tasks; this sample was more culturally insulated due to distances and remoteness. With cultural emphasis on art and weaving, this may be a learned skill at which the child becomes increasingly adept as he or she matures. While Study 2 did not find differences between tribes on mean error scores, it did find many significant differences between grouped tribal data and normative population. Chippewa-Sioux populations also showed a relatively high degree of variance from ages 8-0 upward, suggesting possible developmental lag in visual-motor perception.

Because of the marked between-tribe differences in study 1 and Indian-normative population differences in Study 2, we strongly feel that attempts should be made to establish normative data for larger tribal groupings for culturally determined differences such as emphasis on early visual-motor stimulation, exposure to paper-pencil materials, exposure to dominant cultural values and experiences, and special learned skills which are taught with age maturation within tribes.

Until appropriate norms can be developed, or in the absence of such, these precautions may be observed. The significance of lower mean error scores (i.e., better performance) will not be of marked importance in an educational setting, since it may be assumed that this would not relate to a handicapping condition

that would be detrimental to learning. The existance of higher error scores should not be automatically interpreted to mean that the child has a visual-motor-integration impairment. Even if such a lag is common within the child's tribal group, if he is competing academically with a peer group for which this lag is not common, this information needs to be taken into account in planning educational materials, experiences, and learning expectations. The school program should thus be designed to enhance these skills. The greatest need at this time would appear to be a study which established diagnostic significance of specific drawing imperfections on the Bender over a time period in relation to the child's general learning style and presence of other indicators of learning disabilities or neurological dysfunctioning.

Study 2 seems to indicate that special norms developed for American Indian tribal groups can be utilized whether they reside on or off a reservation. It is noted, however, that none of the non-reservation sample resided in large metropolitan urban areas. Both studies support previous research that separate norms are not needed for male and female subjects. Both studies indicate differences in time utilization which may be a reflection of learned cultural patterns and not of diagnostic significance. This is compatible with previous research findings (Koppineberg, 1927).

Differences in research design obviate some direct comparisons between the two studies which might be helpful in interpreting data. However mean error scores and standard deviations for the grouped Chippewa/Sioux data, as shown in Table 2, and the Navajo and Apache, shown in Table 1, reflect consistently greater variability at upper age levels among the American Indian subjects than is found in the normative group. It seems important to examine the implications of these data for interpretation of psychoeducational test results and program planning.

The normative group becomes much more homogeneous above age 9-0. This suggests a) mastery of skills or b) development of neurological integration

sufficient to execute the Bender designs at this age. Differences in this mastery or maturity rate could be interpreted as a) continuing developmental lag, possibly due to genetic factors, b) continuing educational lag due to cultural differences prior to and continuing after school admission, or c) an increasing gap between American Indian students and dominant culture students in those integration processes which are both prerequisite to and reinforced by mastery of complex academic skills involved in reading, writing, spelling, mathematics, etc.

Looking at the third possibility, the practical implication is that a child who for reasons of cultural background and/or neurological maturation does not have adequate processing organization to master the "simple" academic skills of early school years may fail to progress in these prerequisite skills areas as well as in the academic areas. If this is the case, then we must confront the problem that a Bender score which would be significantly low by the dominant-culture-based norms may not reflect a significant deviation from the American Indian mean, but may still have important implications for educational planning within a system tuned to dominant culture standards. Pragmatically, this means that in a school whose enrollment is 95% American Indian, the important consideration diagnostically is the child's score in relation to specific tribal norms. In a school which is 40% American Indian and which is not on an entirely individualized instructional basis, expectations for a given child (in grade level terms) will probably be based more on dominant-cultural performance levels. In the latter case, the child's Bender score must be considered both in comparison to his tribal norms (within which it may be non-deviant) and the general norms (which may reflect a significant problem). In this context, the child would need an Individualized Education Plan which provides for the differences in functioning level in visual-motor-integration skills in acquisition of academic learning and feedback for evaluation purposes.

It is proposed, then, that development of normative data and diagnostic data for specific American Indian tribal groups is imperative, but that these data must be considered jointly with the standard normative data when the child is in a bi-cultural school program.

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TABLE 1

Mean Error Scores and Standard Deviations--Reservation Samples

Age Range	Navajo $\bar{X}$	Navajo S	Apache $\bar{X}$	Apache S	t	Sioux $\bar{X}$	Chippewa $\bar{X}$
6-0 to 6-11	11.71	2.76	8.77	3.52	3.23**	7.40	8.80
7-0 to 7-11	7.35	3.47	6.37	3.44	1.08	5.73	6.27
8-0 to 8-11	6.19	3.22	5.33	2.35	1.21	4.20	3.47
9-0 to 9-11	4.06	3.45	3.50	2.67	.87	3.73	5.20
10-0 to 10-11	3.00	2.94	4.43	3.07	-2.01*	3.33	3.33

*$P < .05$
**$P < .01$

TABLE 2

Mean Error Scores--American Indian Vs. Norm Group

Age Range	Norm Group M	Norm Group σ	Apache/Navajo X̄	Apache/Navajo z	Chippewa/Sioux X̄	Chippewa/Sioux S	Chippewa/Sioux z
5-0 to 5-5	13.6	3.61	*	*	12.23	3.99	2.08**
5-6 to 5-11	9.8	3.72	*	*	12.66	3.04	4.61**
6-0 to 6-5	8.4	4.12	*	*	9.86	3.21	2.16**
6-6 to 6-11	6.4	3.76	*	*	7.66	3.29	2.09**
7-0 to 7-5	4.8	3.61	7.64	.78	6.21	3.13	2.50**
7-6 to 7-11	4.7	3.34	5.66	.28	6.21	3.36	2.93**
8-0 to 8-5	3.7	3.60	6.11	.66	4.87	3.59	2.32**
8-6 to 8-11	2.5	3.03	5.31	.92	3.81	2.82	2.70**
9-0 to 9-5	1.7	1.76	3.69	1.13	3.64	3.02	6.62**
9-6 to 9-11	1.6	1.69	3.93	1.37	3.65	3.58	8.44**
10-0 to 10-5	1.6	1.67	*	*	3.21	3.11	6.31**
10-6 to 10-11	1.5	2.10	*	*	2.84	3.16	4.32**

* This data not published for this group.

** Significant

TABLE 3

Mean Time Scores--American Indian Vs. Norm Group

Given in Minutes and Seconds

Age Range	Norm Group	Apache/Navajo	z	Chippewa/Sioux	z
5-0 to 5-5	5' 13"	*	*	8' 33"	5.21**
5-6 to 5-11	7' 00"	*	*	9' 12"	4.28**
6-0 to 6-5	6' 20"	5' 53"	- .18	7' 50"	3.50**
6-6 to 6-11	6' 33"	6' 36"	.02	7' 44"	2.83**
7-0 to 7-5	6' 27"	7' 28"	.40	7' 47"	3.36**
7-6 to 7-11	6' 53"	6' 12"	- .27	7' 31"	1.58
8-0 to 8-5	6' 45"	5' 13"	- .53	6' 48"	1.39
8-6 to 8-11	6' 05"	5' 49"	- .34	6' 25"	.79
9-0 to 9-5	6' 17"	*	*	7' 07"	2.41**
9-6 to 9-11	6' 30"	*	*	7' 18"	2.69**

* This data not published for this group.
** Significant.

TABLE 4

Mean Time Scores--Navajo Vs. Apache
Given in Minutes and Seconds

Age Range	Navajo	Apache	t
6-0 to 6-11	7' 35"	5' 47"	1.47
7-0 to 7-11	7' 52"	6' 16"	1.38
8-0 to 8-11	6' 49"	5' 28"	2.43*
9-0 to 9-11	5' 31"	5' 28"	.08
10-0 to 10-11	5' 42"	4' 53"	.87

* $P < .05$